



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Peter Michael Edic et al.

Serial No.: 10/625,321

Filed: July 23, 2003

For: METHOD AND APPARATUS FOR
GENERATING TEMPORALLY
INTERPOLATED PROJECTIONS

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§ Group Art Unit: 2882
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§ Examiner: Ho, Allen C.
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§ Atty. Docket: GERD:0052/YOD/RAR
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Date

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PRE-APPEAL BRIEF REQUEST FOR REVIEW

In accordance with the Official Gazette Notice of July 12, 2005, Appellants submit this Pre-Appeal Brief Request for Review. This Request is filed along with a Notice of Appeal.

In the Final Office Action, the Examiner rejected claims 1-7, 9-23, 25, and 26.

Appellants submit that all of pending claims 1-7, 9-15, 17-23, 25, and 26 are allowable in their present form and respectfully request reconsideration of the above-referenced application in view of the following remarks.

First Rejection Under 35 U.S.C. § 102

The Examiner rejected claims 17 and 25 under 35 U.S.C. § 102(b) as anticipated in view of U.S. Patent No. 6,229,870 (the Morgan reference). Appellants respectfully traverse this rejection.

In the present case, the rejection is not appropriate because the prior art reference that is used to reject the claims does not disclose each and every element of the Appellants' claims. For example, independent claims 17 and 25 recite "a distributed X-ray source configured to rotate

about a volume of interest in eight or more seconds.” Accordingly, Appellants’ technique utilizes a CT system in which the distributed X-ray source takes eight or more seconds to complete a revolution. However, in the Advisory Action, the Examiner asserted that “[t]here is nothing in the claims that limits one revolution of rotation to eight seconds or more.” The Appellants reiterate that claims 17 and 25 explicitly recite “a distributed X-ray source *configured to rotate about a volume of interest in eight or more seconds.*” (Emphasis added). Accordingly, the assertions made by the Examiner are contradictory to the claim recitations.

With regard to the present rejection, the Morgan reference makes no disclosure concerning the rotational speed of an X-ray source. Consequently, there is no teaching in Morgan which suggests or discloses the recited rotation of an X-ray source in eight or more seconds. In responding to this point, the Examiner asserted that “[all] gantries are capable of rotating for eight seconds or more continuously.” *See* Advisory Action, p. 2. Appellants note that the Examiner is misconstruing the claim language. In particular, the claim does not recite that the rotation *occurs for* eight or more seconds and there is no basis for the Examiner to characterize the claim in this manner. Instead the claim recites that the X-ray source rotates “about a volume of interest *in* eight or more seconds.” (Emphasis added).

Regardless, Morgan is silent as to specific rotational speeds *or* durations. To the extent that Morgan is concerned with rotational speed and duration, Morgan discusses solving the problem of long imaging times and stresses that advantages of the Morgan invention include significantly improved imaging time and imaging in substantially real time. Morgan, col. 1, lines 26-28, 38-39; col. 3, lines 1-5; and col. 5, line 65 to col. 6, line 1. Therefore it is clear that Morgan does not disclose, or even suggest, rotational speeds such as those contemplated in claims 17 and 25.

Moreover, to the extent that the Examiner’s rejection relies on the possibility that the X-ray source of Morgan *could* rotate about a volume in eight or more seconds, Appellants respectfully note that this is insufficient to establish inherency. Indeed, the Appellants respectfully note that the Examiner has the burden of proof for showing inherency and must demonstrate that the missing descriptive matter is *necessarily* present in the Morgan reference and would be so recognized by those of ordinary skill in the art. *See* M.P.E.P. § 2112, IV. In other words, the Examiner must show that the Morgan reference discloses a distributed X-ray source that *must* be configured to rotate about a volume of interest in eight or more seconds. The Examiner assertion that the X-

ray source *could* rotate in such a manner is clearly legally insufficient. Final Office Action, p. 2. Absent a showing of the recited rotational speed, either explicitly or inherently, in the Morgan reference, the Appellants request withdrawal of the rejection of claims 17 and 25.

Second Rejection Under 35 U.S.C. § 102

Appellants respectfully note that the Examiner indicated that claims 17 and 25 were finally rejected under Morgan as discussed above. Final Office Action, p. 2. However, the Examiner's discussion of claim 25 referenced only the Casey reference, presumably U.S. Patent No. 5,175,754. *Id.* at p. 3. Therefore, Appellants provide the following discussion with regard to Casey for the sake of completeness.

The Casey reference cannot anticipate independent claim 25 because it fails to disclose a distributed X-ray source comprised of a *plurality* of addressable X-ray focal spots. At best, the Casey reference discusses an X-ray source 12 which projects X-rays from a single focal spot, where the focal spot "wobbles". Casey, col. 4, lines 34-38, 63-68. Therefore, no *prima facie* case of anticipation is believed to exist with regard to claim 25 in view of Casey. If the Examiner wishes to maintain the present rejection the Appellants respectfully request that the Examiner provide specific citations to the Casey reference disclosing the distributed X-ray source as presently recited. Absent such a showing, the Appellants respectfully request withdrawal of the rejection of claim 25.

Rejection Under 35 U.S.C. § 103

The Examiner rejected claims 1 and 9 under 35 U.S.C. § 103(a) as obvious in view of the Morgan and Casey references. Appellants traverse these rejections.

The obviousness rejection based on the Morgan and Casey references is improper since both references taken alone or together fail to disclose each and every element recited in the claims. Particularly, as set forth above, the claimed act of "rotating a gantry comprising a distributed X-ray source about a volume of interest, wherein a rotational period of the gantry is *greater* than eight seconds" is not taught in either reference. (Emphasis added).

The Examiner suggests that such a modification would be obvious since it would result in higher resolution images. Final Office Action, p. 4. This reasoning, however, is only true in limited circumstances as described in Casey, i.e., when motion is not present. Casey, col. 2, lines 1-5.

Furthermore, this reasoning neglects the obvious reasons why one of ordinary skill in the art would *not* increase gantry rotation speed in the manner described by the Examiner. Increasing gantry rotation speed in the manner described by the Examiner would also increase scan time, particularly if multiple rotations are contemplated. One of ordinary skill in the art might not view such a scan time/resolution tradeoff to be worth while beyond an eight second rotation period. Therefore, one of ordinary skill in the art would recognize that, beyond a certain point, increased scan time is not desirable for incrementally better resolution.

Moreover, the Examiner's reasoning rests on the premise that by rotating the X-ray source of Casey slower than eight seconds per rotation, more than 7,872 projections can actually be acquired, i.e., that the CT machine is capable of emitting X-rays at more than 7,872 angular positions. *Id.* Absent some showing by the Examiner that the commercial CT system as described in Casey is actually capable of acquiring projection data at more than 7,872 angular positions in a rotation, one of ordinary skill in the art would *not* be motivated to increase scan time to merely get the same amount of projection data. In other words, once the number of projections that can be acquired in a rotation is maximized, the resolution is also maximized, and simply rotating the X-ray source slower won't result in any improvement in resolution, i.e., more projections won't be acquired. The Examiner ignores this point and provides no basis for why one of ordinary skill in the art would believe resolution could be increased by rotating an X-ray source for more than eight seconds. In view of the deficiency of the cited combination to disclose all elements recited in claims 1 and 9, no *prima facie* case of obviousness exists.

Furthermore, there is no motivation to combine the Morgan and Casey references in the manner suggested by the Examiner. In particular, neither the Casey nor the Morgan reference discloses a motivation for CT gantries to have rotational periods *greater* than eight seconds. Indeed, as noted above, the Morgan reference discusses solving the problem of long imaging times and stresses that advantages of the Morgan invention include significantly improved imaging time and imaging in substantially real time. Morgan, col. 1, lines 26-28, 38-39; col. 3, lines 1-5; and col. 5, line 65 to col. 6, line 1. Therefore it is clear that Morgan does not disclose, or even suggest, the use of slower rotational speeds, such as those contemplated in claims 1 and 9.

Likewise, the Casey reference discloses motivations for having CT gantries with higher (i.e., faster), not lower, rotational periods, so that images of moving organs may be obtained. Casey, col.

2, lines 3-5. In responding to this point, the Examiner asserted that “a person would be motivated to increase the resolution of a tomographic image by rotating at a longer rotational period when imaging *a non-moving organ.*” Advisory Action, page 2. No such non-moving organ is recited in claims 1 and 9, however, nor do the Casey or Morgan references explicitly address such limited embodiments (the Casey discussion referenced by the Examiner is in the background and is not a part of the invention, or even tangential subject matter, of the Casey invention). Regardless, in view of the stated motivations provided in Morgan to faster, even real-time, imaging, one of ordinary skill in the art would not be motivated to modify Morgan in the manner suggested by the Examiner such that scan times were *increased*.

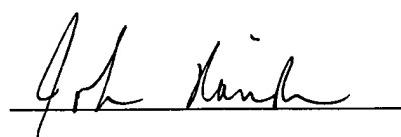
Indeed, the only reasonable motivation to combine the Morgan and Casey references in the manner described by the Examiner would be to deprecate the presently claimed subject matter based on the disclosures within the Appellant’s application. Such hindsight analysis is not permitted, however.

Conclusion

In view of the above remarks, Appellants request allowance of the pending claims.

Respectfully submitted,

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